## REMARKS/ARGUMENTS

The Office Action of May 16, 2007 has been reviewed and carefully considered.

Claims 1 to 12 remain pending, with each of independent claims 1 to 4 being amended herein. Claims 5 to 12 are variously dependent from independent claims 1 to 4.

Reconsideration of the above-identified application, as herein amended, is respectfully requested.

Claims 1 to 12 stand rejected under 35 USC §103(a) as allegedly unpatentable over previously-cited Harter (U.S. Patent 6,447,132) in view of newly-cited Walsh et al. (U.S. Patent 5,886,681).

As applicant has previously explained (see, for example, applicant's "Pre-Appeal Brief Request for Review - Applicant's Arguments", the present invention is directed to a method (claims 1 and 4) and apparatus (claims 2 and 3) for variably illuminating a flat panel display with two different types of illumination based on the level of ambient light. In bright light (e.g. daylight), a fluorescent lamp illuminates the flat panel, while under low ambient light conditions (e.g., nighttime) one or more LEDs (light emitting diodes) illuminate the display. At an intermediate level of brightness (a "transition illumination level"), the two types of light are variably combined to provide a seamless transition between the predetermined upper and lower ranges of illumination. The inventive method and apparatus are most especially useful in controlling the internal or backlit illumination of a flat panel display on which flight-related information is presented to the flight crew in the cockpit of an aircraft, in which the display illumination level must be maintained – to avoid overwhelming the flight crew's vision with critical flight information displays illuminated with either too much, or too little, light – within a suitable range while smoothly varying the display

illumination, particularly as the critical transition between the high level fluorescent lamp and low-level LED-based illumination is effected.

The invention provides two types of illumination sensors (which are implemented by photosensors in the disclosed embodiments): one to monitor the light impinging on the panel (i.e. ambient light), and one to monitor the level of generated light that is illuminating the panel (i.e. the current display screen illumination level or *brightness*). The two monitored levels are compared and the supply of operating power to the fluorescent lamp and to the LEDs are adjusted so that at all times the proper, intended level of light illuminates the panel and is varied in an uninterruptedly smooth manner throughout the range of illumination which extends between a predetermined maximum illumination level suitable for viewing of the display screen in ambient daylight conditions and a predetermined minimum illumination level suitable for viewing of the display screen in ambient night conditions.

The key to the advance provided by the present invention is in its ability to provide an uninterruptedly smooth variation in the display screen illumination level or brightness in the region at and about the so-called "transition illumination level" -- i.e. the point at which the source of illumination for the display screen is switched between the high-output fluorescent lamp and the low output LED(s). The difficulty in illuminating the display screen at specific, intended brightness levels in this transition region arises because of certain inherent operating characteristics of fluorescent lamps, namely *persistence* associated with deactivation of a fluorescent lamp, and the lag or delay in the emission of light from a fluorescent lamp when the plasma in the fluorescent lamp energizes as power is first applied to the lamp. To compensate for these characteristics of fluorescent lamps, the present invention monitors the *actual* "current display screen illumination level" – i.e. its actual *brightness* – and provides the monitored level to the controller which operates

(i.e. supplies electrical operating power to) the fluorescent tube and the LED(s). By doing so, uninterruptedly smooth variation of the display screen illumination level is assured as the screen illumination level is varied throughout its entire range between its predetermined maximum illumination level suitable for viewing of the display screen in ambient daylight conditions and its predetermined minimum illumination level suitable for viewing of the display screen in ambient night conditions, and most especially at and about the predetermined transition illumination level at which a change between the two (i.e. between the high and low level) sources of display illumination is effected. In the preferred forms of the invention disclosed by applicant, the display illumination level or brightness sensor is an optical photosensor.

The cited Harter patent discloses a two-level brightness control for a vehicle head up display (HUD) in which (Fig. 2) a high brightness light source 21 is operated to illuminate an image-projecting LCD electronic display 26 in bright or daylight conditions, and a low brightness light source 22A, 22B is operated to illuminate the display in low light and nighttime conditions. Harter teaches that the high brightness light source 21 is preferably "one or more halogen bulbs that produce bright light 21A" (column 4, lines 20 to 22), and that the low brightness light sources 22A and 22B are preferably "one more fluorescent lights suitable for producing low brightness light" (column 4, lines 45 to 47). Operation of the high and low brightness light level sources is based *solely* on a*mbient light conditions* which are monitored by a light sensor 17 mounted on the outside of the vehicle

The Examiner expressly acknowledges in the Office Action (see the first full paragraph on page 5 of the Action) that Harter "does not disclose monitoring the current display screen illumination level and providing said monitored level to a display screen illumination level controller that is operable for illuminating the display screen at said determined desired display

screen illumination level", as each of applicant's claims recite. The Examiner now cites the Walsh reference in an effort to remedy that deficiency. However Walsh, as explained below, in fact *fails* to supply that which Harter does not teach.

Walsh is directed to a backlit LCD display for use in an avionics application, in which the display is illuminated by high intensity fluorescent tubes for daylight viewing conditions and by lower intensity lamps for night conditions. The Walsh sysem additionally employs "photosensor controlled intensity feedback to provide smooth continuous dimming transition from a wide range of maximum to minimum intensity." (See column 2, lines 19 to 23 of Walsh). More particularly, as explained in the Walsh specification,

> "Photosensor devices 123*a* and 123*b* are provided to *monitor the output levels of nightlight lamps* 114*a* and 114*b* respectively. Photo sensor device 123*c* *monitors the output level of daylight lamp unit* 110. The electrical output signals from photo sensors 123*a* and 123*b* *representative of the light levels of nightlight lamps* 114*a* and 114*b* are connected to night lamp driver means 124 and the electrical output signal from photo sensor 123*c* *representative of the light level of daylight lamp unit* 110 are connected to daylight lamp driver means 120.
>
> Intensity control means 126 is connected to and responsive to a "brightness command" signal on lead 128 which selects a desired intensity level. Intensity control means 126 provides a Sn (night) intensity level to night lamp driver means 124 and a Sd (day) intensity level signal to day lamp driver means 120.
>
> Intensity control means 126, which is responsive to the brightness command signal on lead 128, contains a look-up table that contains the known characteristics of the particular type of drivers and lamps used in the system [and] produces appropriate output intensity signals Sd and Sn as a function level of the brightness command signal on lead 128.
>
> Intensity control means 126 contains a processor including a comparison means that compares *the intensity levels of the daylight and nightlight lamps* and the intensity level of the brightness command signal to generate the Sd and Sn signals." (Column 3, line 63 to Column 4, line 22) (Emphasis supplied)

Thus, as the cited reference clearly explains, the Walsh system seeks to control the intensity of the display screen illumination or brightness *by monitoring the light output levels or brightness of*

*its high intensity and low intensity lamps*, with which the LCD display screen is backlit, to appropriately vary the operating signals sent to the lamps. In applicant's inventive method and system, on the other hand, it is the *current brightness of the display screen itself* that is monitored, *not* the illumination intensity or brightness of the *lamps* with which the display screen is lit. This is an important and fundamental difference between the teachings of the present invention and that of Walsh and all other known prior art. Whereas applicant's method and system provides a direct and therefore inherently reliable determination of the *actual brightness level of the display screen*, Walsh simply monitors the brightness levels of the illuminating lamps via which the display screen is backlit and then consults "a look-up table that contains the known characteristics of the particular type of drivers and lamps used in the system" (Walsh col. 4, ll. 13-15) as an *indirect* indicator of what it *expects* the resulting brightness of the display screen to be. *Nothing* in Walsh either teaches or suggests monitoring of the current display screen illumination level through sensing of the current display screen *brightness*, as in the method and apparatus of applicant's invention.

To further emphasize and clarify this important distinction, each of independent claims 1 through 4 has been amended to now recite that monitoring of the current display screen illumination level is effected "by sensing current display screen *brightness*". Support for this amendment can be found throughout the instant application; see, for example, paragraph 26 at page 13 of applicant's originally-filed specification ("Feedback photosensor 42 provides controller 40 with the detected current level of brightness of FPD 10, and controller 40 compares the determined desired level of brightness with the actual detected level of brightness (step 106).") Walsh, as pointed out above, contains no such teaching or suggestion that meets this clarifying amendment and express recitation which is present in each of applicant's claims.

Accordingly, the Examiner's proffered combination of Harter and Walsh clearly *fails* to disclose or render obvious the subject matter set forth in applicant's claims, each of which is patentably distinct over the prior art for *at least* the reasons herein discussed.

In view of the foregoing, applicant submits that all of its claims 1 to 12 now pending in the instant application are in condition for allowance and such action, and early passage of the case to issue, are once more requested.

Respectfully submitted,

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